

# **ELEVATOR BELT ASSEMBLY WITH WAXLESS COATING**

## **BACKGROUND OF THE INVENTION**

[1] This invention generally relates to elevator belts or ropes having at least one load bearing member with a coating. More particularly, this invention relates to an elevator rope or belt assembly having a waxless urethane coating.

[2] Elevator systems typically include a cab for carrying passengers between landings in a building. A counterweight is often associated with the cab. The counterweight and cab typically are coupled using a rope or belt. In some configurations, the rope or belt includes a plurality of load bearing members such as steel cords or strands. The load bearing members typically are coated with a urethane coating.

[3] One difficulty associated with conventional urethane coatings is that the urethane material typically includes one or more waxes. The waxes typically are included as part of the urethane manufacturing process. The wax typically is included, at least for facilitating later molding processes because the wax makes it easier to remove a final product from a mold.

[4] A particular difficulty presented by the presence of such waxes in elevator systems is that the wax tends to reduce friction between the roping or belt and the associated sheaves in the elevator system. Over time, the wax can build up on the sheaves, which further reduces the friction characteristics within the elevator system. Because friction is necessary to drive the elevator system components and move the cab as desired, any wax or other material that reduces friction is undesirable.

[5] Accordingly, there is a need for a increased friction arrangement for coated roping or belts in an elevator system. This invention addresses that need while avoiding the shortcomings and drawbacks of prior arrangements discussed above.

### **SUMMARY OF THE INVENTION**

[6] In general terms, this invention is an elevator roping or belt assembly that has a waxless coating. An assembly designed according to this invention includes at least one load bearing member. In one example, a plurality of metallic strands or cords are load bearing members. A urethane coating on the load bearing member does not contain any wax.

[7] The various features and advantages of this invention will become apparent to those skilled in the art from the following detailed description of the currently preferred embodiment. The drawings that accompany the detailed description can be briefly described as follows.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

[8] Figure 1 schematically illustrates an elevator system including an assembly designed according to this invention.

[9] Figure 2 schematically illustrates an elevator roping assembly designed according to this invention.

### **DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT**

[10] An elevator system 20 includes a cab 22 for carrying passengers between a plurality of landings (not illustrated) within a building. A counterweight 24 is coupled with the cab 22 by at least one load bearing assembly 26. The load bearing assembly 26

may be a roping assembly or a belt, depending on the particular configuration required for a particular elevator system. This invention is not limited to “ropes” or “belts” in the strictest sense. Either is within the scope of this invention. Therefore, the use of the term “rope” or “belt” within this specification should not be limited in its strictest sense, but the two should be considered interchangeable or synonymous as appropriate.

[11] Sheaves 28 and 30 guide the belt 26 along a chosen path to move the cab 22 between the various landings. A conventional drive mechanism 32 is associated with the sheave 30 to drive the belt and move the elevator components as desired. The counterweight 24 and cab 22 move within a hoistway (illustrated in phantom at 34) in a conventional manner.

[12] The belt assembly 26 preferably includes a plurality of load bearing members 40, which may be metallic or non-metallic aramids, for example. Examples of such load bearing members include cords or strands. The load bearing members are arranged in a conventional fashion (such as helical winding) to provide the desired strength characteristics within a particular elevator system.

[13] A urethane coating 42 is secured to the load bearing members 40. At least a portion of the load bearing members are covered with the urethane coating 42. In some examples, the load bearing members 40 are completely encased in the urethane coating 42.

[14] The urethane coating 42 preferably is a thermal polyurethane material. The urethane coating does not contain any waxes. The typical stearate-based waxes that are

routinely added to urethane materials are not included in the urethane coating 42.

Therefore, the urethane coating 42 preferably is waxless.

[15] Because there is no wax added to the urethane coating 42, the process of making a belt assembly 26 designed according to this invention is somewhat different than conventional belt manufacturing processes. For example, a mold wheel that is used as part of forming the belt assembly 26 preferably is coated with a release agent to ensure part consistency and proper release from the mold. Given this description, those skilled in the art will be able to choose from among commercially available and suitable release agents. The release agent is added to compensate for the absence of the wax from the urethane material.

[16] Additionally, the tooling used to make the belt assembly 26 preferably includes a pull-off mechanism that is stronger than typically required because of the absence of wax from the urethane material, which otherwise facilitates removal from the mold. Additionally, it is believed that adjustments to the cutting process may be necessary to ensure exact product dimensions for quality control. Given this description, those skilled in the art will realize the types of tooling adjustments necessary to compensate for the absence of the waxes from the urethane material used to make the coating 42.

[17] An elevator roping assembly designed according to this invention provides superior friction characteristics within an elevator system. The waxes that otherwise interfere with friction and which may build up on sheaves within the elevator system are eliminated, and therefore a more consistent operation is achieved.

[18] The preceding description is exemplary rather than limiting in nature. Variations and modifications to the disclosed embodiment may become apparent to those skilled in the art that do not necessarily depart from the purview and spirit of this invention. The scope of legal protection given to this invention can only be determined by studying the following claims.